REMARKS

The Notice of Non-compliant Amendment mailed December 17, 2007, in the above-identified application, is noted. This Notice indicates that the Amendment document filed on November 21, 2007, is considered non-compliant, in that the Amendment filed November 21, 2007, does not contain markings indicating the changes that have made relative to the immediate prior version of the claims filed September 12, 2007, as required under 37 CFR 1.121(c)(2). The Amendment filed November 21, 2007, contained markings indicating the changes that had been made relative to the immediately prior version of the claims that had been entered.

In any event, in order to avoid any issue as to the claim amendments, Applicants respectfully request that the present "Amendments to the Claims" section be substituted for the claims amendments section of the Amendment filed November 21, 2007; and by the present amendments all prior claims in the application have been cancelled without prejudice or disclaimer, and "new" claims 54-64 have been added to the application. Claims 54-64 are respectively in substance the same as claims 1-4, 7, 10, 11 and 50-53, of the claims set forth in the Amendment filed November 21, 2007.

It is respectfully submitted that the present claim amendments are clearly proper under 37 CFR 1.121, in that "new" claims are being presented without any markings, as appropriate under 37 CFR 1.121(c)(3).

The comment by the Examiner in the Notice mailed December 17, 2007, that there is no indication anywhere in the Remarks section of the Amendment (apparently, the Amendment filed November 21, 2007) referring to the support in the specification for the new claims 50-53, is noted. Note that claims 50-53 of the Amendment filed

November 21, 2007, corresponding to claims 61-64 of the present claims, corresponded respectively to claims 46-49 as proposed to be added in the Amendment filed September 12, 2007. On page 7 of the Amendment filed September 12, 2007, pages 16 and 17 of Applicants' specification was referred to, in connection with the subject matter of claims 46-48.

In any event, with respect to the subject matter of present claims 61-64, corresponding to claims 50-53 of the Amendment filed November 21, 2007, the Examiner's attention is respectfully directed to the sole full paragraph on page 16, and the paragraph bridging pages 16 and 17, of Applicants' specification (with respect to the subject matter of claims 61 and 62); to the first full paragraph on page 17 of Applicants' specification (with respect to the subject matter of claim 63); and to the last full paragraph on page 23 of Applicants' specification the sole paragraph on page 25 of Applicants' specification (with respect to the subject matter claim 64).

Applicants respectfully traverse the contention by the Examiner that Applicants' have not paid the necessary fee for the Terminal Disclaimer filed September 12, 2007. In connection therewith, attention is respectfully directed to the enclosed Electronic Patent Application Fee Transmittal, for the above-identified application, in connection with the Amendment filed September 12, 2007, in the above-identified application. Also enclosed is the Electronic Acknowledgement Receipt for this Amendment filed September 12, 2007. Note that payment information on the Electronic Acknowledgement Receipt was a payment of $1,150, corresponding to a three months extension and to a processing fee with fee code 1808, of $130, as set forth on the enclosed Electronic Patent Application Fee Transmittal. It is respectfully submitted that

the processing fee with fee code 1808 of $130 is payment of the necessary fee in connection with the Terminal Disclaimer submitted with the Amendment filed September 12, 2007. Acknowledgement of receipt of the fee for the Terminal Disclaimer submitted September 12, 2007, is respectfully requested. As the necessary fee for the Terminal Disclaimer has been submitted, reconsideration and withdrawal of the obviousness-type double patenting rejections, set forth in the Office Action mailed March 12, 2007, are respectfully requested.

As the necessary Terminal Disclaimer and fee have previously been submitted, with the Amendment filed September 12, 2007, it is respectfully submitted that a further Terminal Disclaimer and further fee are not necessary. In any event, such Terminal Disclaimer and fee are incorporated in the present Amendment by reference, again noting that the fee in connection with the Terminal Disclaimer has been paid.

In view of all of the foregoing, it is respectfully submitted that the obviousness-type double patenting rejections in the Office Action mailed March 12, 2007, have clearly been overcome, and no further comments in connection therewith is necessary, except to add that Applicants incorporate herein by reference contentions made in connection with the obviousness-type double patenting rejections as in the paragraph bridging pages 7 and 8, and the first full paragraph on page 8, of the Amendment filed September 12, 2007.

In addition, the undersigned notes comments by the Examiner in Item 6 on page 4 of the Communication mailed September 21, 2007. In view thereof, it is respectfully submitted that the rejection over Japanese Document No. 2002-280494

should be withdrawn, and no further discussion of the merits of this rejection will be set forth herein.

Applicants respectfully submit that all of the claims presented for consideration by the Examiner patentably distinguish over the teachings of the references applied by the Examiner in rejecting claims in the Office Action mailed March 12, 2007, that is, the teachings of the U.S. patent documents to Inada, et al., No. 5,965,269, to Tomiyama, et al., No. 7,070,670, to Yanagiuchi, et al., No. 6,521,337, to Shimada, et al., No. 6,090,468, to Tanaka, et al., No. 6,673,441, and to Teiichi, et al., Patent Application Publication No. 2003/0069331, and the Japanese patent documents No. 09-298369, No. 09-302313, No. 2000-248025, and No. 2002-060716, under the provisions of 35 USC 102 and 35 USC 103.

It is respectfully submitted that the references as applied by the Examiner would have neither taught nor would have suggested such an adhesive sheet as in the present claims, having a polymer component that includes acrylic rubber having a glass transition temperature and weight-average molecular weight as recited in claim 1, the adhesive sheet having a breaking strength in the B-stage of from 0.1 to 10 MPa at 25°C, and a breaking elongation from 1-40% at 25°C, the adhesive sheet having the property that it can be laminated together with dicing tape onto a wafer prior to stealth dicing, and is capable of being subjected to stealth dicing. See claim 54.

In addition, it is respectfully submitted that the teachings of the applied references would have neither disclosed nor would have suggested such adhesive sheet as in the present claims, laminated together with the dicing tape onto the wafer, prior to stealth dicing. See claim 64.

Furthermore, it is respectfully submitted that the teachings of the applied references would have neither disclosed nor would have suggested such adhesive sheet as in the present claims, having features as discussed previously in connection with claim 54, and, additionally, having the elastic modulus of the adhesive sheet in a B-stage state as in claims 55-57; and/or amount of acrylic rubber contained in the adhesive sheet as in claim 58, and more specifically, as in claims 61 and 62; and/or content of remaining volatile matters in the adhesive sheet, as in claim 59; and/or film thickness of the adhesive sheet, as in claim 60; and/or wherein the polymer component further includes epoxy resin (see claim 63).

The present invention is directed to an adhesive sheet, suitable for joining a semiconductor element with a semiconductor-element-mounting support member, and which adhesive sheet can be laminated together with dicing tape onto a wafer and is capable of being subjected to stealth dicing.

In recent years, various wafer-cutting methods have been suggested, for cutting the wafer into individual chips. Such methods include methods of processing the wafer so that, subsequently, the wafer can easily be cut. One technique is the step of forming modified regions of the wafer by radiating a laser into the wafer along lines intended to be cut; and, subsequently, cutting the wafer, by, for example, the application of external force thereto. This technique is the so-called stealth dicing technique. Note the paragraph bridging pages 3 and 4 of Applicants' specification.

In order to manufacture a semiconductor device according to a wafer-back-face sticking mode by use of, e.g., stealth dicing, it is necessary to cut an adhesive sheet and a wafer simultaneously. However, when conventional adhesive sheets are used, it

is difficult to cut the sheet at the same time as a wafer is cut. When a non-elastic adhesive sheet having a good breakability is used as the adhesive sheet, the adhesive sheet and wafer can be simultaneously cut in the state that cutting faces of the two are made substantially consistent; however, the non-elastic adhesive sheet has a low fluidity, and, therefore, the sheet is not easily stuck onto the wafer at relatively low temperatures of, e.g., 100°C or lower. Additionally, the adhesive sheet can be cracked, since the adhesive sheet itself is brittle.

Against this background, Applicants provide an adhesive sheet having the properties of being laminated together with dicing tape onto a wafer prior to stealth dicing, and which is capable of being subjected to stealth dicing discussed previously. Applicants have found that through use of the specific polymer component as in claim 54, the adhesive sheet having properties as in the present claims, the adhesive sheet can be used advantageously in, e.g., stealth dicing. When the adhesive sheet is laminated together with dicing tape onto a wafer and diced by stealth dicing, the adhesive sheet shows excellent breakability and laminating properties, as shown in Tables 1 and 4 on pages 34 and 46, respectively, of Applicants' specification.

In particular, as described on pages 5 and 6 of Applicants' specification, the present inventors have found out that when the breaking strength and the breaking elongation of an adhesive sheet in a B-stage state at 25°C are restricted into specific numerical ranges, in connection with specific sheets, the adhesive sheet has the property that it can be cut at the same time as a wafer is cut at room temperature. Furthermore, the inventors have found that in order for an adhesive sheet to keep flexibility at room temperature and be cut at the same time as a wafer is cut at room

temperature, it is necessary that the elastic modulus of the adhesive sheet has a specific frequency dependency. The frequency dependency is a phenomenon that a sample has an elastic modulus variable in accordance with the frequency of a strain applied to the sample in the measurement of dynamic viscoelasticity. Note the paragraph bridging pages 5 and 6 of Applicants' specification.

Yanagiuchi, et al. discloses an adhesive tape for painting, and method of manufacturing this tape, the tape being used for painting vehicles such as automobiles and motorcycles. The adhesive tape includes an adhesive layer having a top surface; a paint layer including paint and provided on the top surface of the adhesive layer; and a clear coating layer laminated on the paint layer. See column 1, lines 62-67. According to Yanagiuchi, et al., the painting adhesive tape has a paint layer formed of paint itself, so that quite the same finish as that obtained in the case where the paint is directly painted can be obtained. Note column 2, lines 1-9. See also column 3, lines 43-60, describing that the adhesive layer of the painting adhesive tape can be formed from conventionally used pressure-sensitive adhesives or heat-sensitive adhesives, examples of such adhesives including adhesives containing natural rubbers, acryl based resins, ethylene-vinylacetate copolymers, polyurethane, polyester, silicone rubbers, fluoro based rubbers, or polyvinylbutyral as their major component.

As can be seen from the foregoing, as well as from a full review of Yanagiuchi, et al., this patent relates to an adhesive tape for painting. It is respectfully submitted that this patent does not disclose, nor would have suggested, such adhesive sheet as in the present claims, having the recited characteristics as in the present claims including the

property that the adhesive sheet can be laminated together with dicing tape onto a wafer prior to stealth dicing, and is capable of being subjected to stealth dicing.

In Item 4 on page 3 of the Communication dated September 21, 2007, the Examiner notes various parameters of the adhesive layer, of the painting adhesive tape of Yanagiuchi, et al., and contends that properties of the adhesive layer are encompassed by and overlap the presently claimed parameters. However, it must be emphasized that the present claims recite an adhesive sheet. Moreover, in contrast thereto, Yanagiuchi, et al. discloses an adhesive tape for painting including, in addition to an adhesive layer, a paint layer. It is respectfully submitted that the adhesive tape of Yanagiuchi, et al. would have neither taught nor would have suggested the adhesive sheet of the present claims, including properties thereof and advantages thereof.

The rejections of claims under 35 USC 102 or under 35 USC 103 as set forth on pages 8 and 9 of the Office Action mailed March 12, 2007, and in Item 5 on page 3 of the Communication mailed September 21, 2007, are noted. Ten references individually are applied in these rejections. As will be shown in the following, it is respectfully submitted that these references would have neither taught nor would have suggested such adhesive sheet as in the present claims, and advantages thereof.

Inada, et al. discloses an adhesive produced by preparing a varnish of a composition, the composition being described, for example, in column 4, lines 12-34 thereof.

Tomiyama, et al. discloses an adhesive composition as described most generally in column 5, lines 19-48, and an adhesive film as described most generally in column 5, line 49 to column 6, line15. The adhesive film is described as being a film that connects

a semiconductor chip and a substrate, or connects semiconductor chips themselves, as described in column 5, lines 49-53.

It is respectfully submitted that neither of Inada, et al. or Tomiyama, et al. discloses adhesive sheets used for stealth dicing; or, more particularly, having properties as in the present claims, such that the adhesives can be used for stealth dicing. It is respectfully submitted that these references do not consider about breakability and laminating properties, achieved according to the present invention.

Shimada, et al. discloses an adhesive composition for multilayer wiring boards for mounting a semiconductor device, the adhesive composition being described, for example, in column 2, lines 28-62 thereof.

As with Inada, et al. and Tomiyama, et al., it is respectfully submitted that Shimada, et al. does not consider breakability and laminating properties of the adhesive sheets; and it is respectfully submitted that this reference does not disclose, nor would have suggested, the combination of specific polymer component and properties, providing an advantage in application for stealth dicing.

Tanaka, et al. discloses an adhesive, in columns 3 and 4 of the patent, including an epoxy resin and a hardener therefor, together with a latent curing accelerator and an epoxidized acrylic copolymer. The glass transition temperature and weight average molecular weight of the epoxidized acrylic copolymer are disclosed.

Teiichi, et al. discloses an adhesive composition for use in mounting semiconductors, the adhesive composition being described on page 2 of this patent document, e.g., in paragraph [0017] thereof.

It is respectfully submitted that neither of Tanaka, et al. or Teiichi, et al. would have disclosed or would have suggested the adhesive sheet of the present claims, having the specific component of the specified acrylic rubber, and the properties such that the sheet has advantages in stealth dicing, including breakability and laminating properties.

Attention is also directed to the four Japanese patent documents applied by the Examiner on page 8 of the Office Action mailed March 12, 2007.

No. 9-298369 discloses an adhesive layer for a multilayer wiring board, having a specific modulus of elasticity and including an epoxy resin and a phenolic resin together, together with a high-molecular-weight resin which is compatible with the epoxy resin, a rubber whose weight average molecular weight is 100,000 or higher, and a hardening promoter.

No. 9-302313 discloses an adhesive or bonding sheet including liquid epoxy resin and its curing agent, a high-molecular-weight resin, curing accelerator, and coupling agent, for use in preparing a multilayered wiring board.

No. 2000-248025 discloses acrylic resins suitably used for adhesives and adhesive films having various properties required when installing semiconductor chips having large differences in heat expansion coefficients to various high density printed circuit boards.

No. 2002-060716 discloses a low-elastic adhesive having heat and moisture resistances required for packaging a semiconductor chip having a great difference in coefficient of thermal expansion in a wiring substrate, this adhesive including an epoxy resin and curing agent therefor, an epoxy group-containing acrylic copolymer having

specified glass transition temperature and number-average molecular weight, a curing accelerator, silicone rubber filler and a coupling agent.

It is respectfully submitted that none of the applied Japanese patent documents disclose or would have suggested properties for stealth dicing as in the present claims, and, in particular, do not disclose, nor would have suggested, an adhesive sheet as in the present claims, having the specific polymer component, and having advantageous breakability and laminating properties for stealth dicing, wherein the adhesive sheet has the property that it can be laminated together with dicing tape onto a wafer prior to dicing and is capable of being subjected to stealth dicing, as in the present claims.

The contention by the Examiner as to inherency of properties, set forth in Item 11 on page 8 of the Office Action mailed March 12, 2007, is noted. It is emphasized that the compositions of the references applied as prior art include many different materials, having effects on properties of the composition. In view of the specifically disclosed compositions of the prior art, including components in addition to those in the present claims, it is respectfully submitted that the Examiner has not established inherency.

The contention by the Examiner in the last four lines on page 3 of the Communication mailed September 21, 2007, that the claim language of the capability of the adhesive sheet "merely indicates the ultimate intended utility of the adhesive sheet and is not a critical limitation" is respectfully traversed. Clearly, such claim language, of the claims as presently amended, recite a property of the adhesive sheet, which constitutes a structural recitation which must be considered in determining patentability. Noting especially that this property is recited in a "wherein" clause at the end of claim 1 (e.g., not in the preamble), it is respectfully submitted that the Examiner must give

weight to this "wherein" clause in a determination of patentability of the presently claimed subject matter.

In view of all of the foregoing comments and amendments, entry of the present amendments (as a complete response to the Office Action mailed March 12, 2007), and reconsideration and allowance of all claims presently pending in the above-identified application, are respectfully requested.

Applicants request any shortage in fees due in connection with the filing of this paper be charged to the Deposit Account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (case 1204.45675X00), and credit any excess payment of fees to such Deposit Account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP

By **/William I. Solomon/**
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Enclosures: Electronic Patent Application Fee Transmittal; Electronic Acknowledgement Receipt

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Electronic Patent Application Fee Transmittal

Application Number:	10559684
Filing Date:	06-Dec-2005
Title of Invention:	Adhesive sheet, dicing tape intergrated type adhesive sheet, and semiconductor device producing method
First Named Inventor/Applicant Name:	Teiichi Inada
Filer:	William Ivan Solomon/Kelli Harris
Attorney Docket Number:	1204.45675X00

Filed as Large Entity

U.S. National Stage under 35 USC 371 Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 3 months with $0 paid	1253	1	1020	1020

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Processing Fee, except for Provis. apps	1808	1	130	130
			Total in USD ($)	**1150**

Electronic Acknowledgement Receipt

EFS ID:	2189829
Application Number:	10559684
International Application Number:	
Confirmation Number:	1866
Title of Invention:	Adhesive sheet, dicing tape intergrated type adhesive sheet, and semiconductor device producing method
First Named Inventor/Applicant Name:	Teiichi Inada
Customer Number:	20457
Filer:	William Ivan Solomon/Kelli Harris
Filer Authorized By:	William Ivan Solomon
Attorney Docket Number:	1204.45675X00
Receipt Date:	12-SEP-2007
Filing Date:	06-DEC-2005
Time Stamp:	18:55:24
Application Type:	U.S. National Stage under 35 USC 371

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)

1	Extension of Time	45675X00-3MoEOT.pdf	134158 1bbeea2de6eeed790d0c83l3da31e31b28ebbf31	no	1
Warnings:					
Information:					
2	Amendment - After Non-Final Rejection	45675X00-Amend.pdf	106532 755ba2bb9fa7lac491b8l3e8bf28dfbb448eabed	no	15
Warnings:					
Information:					
3	Terminal Disclaimer Filed	45675X00-TermDiscl.pdf	72583 e0b7653a22a41bdce499a820380fcd7de6f3d325	no	3
Warnings:					
Information:					
4	Fee Worksheet (PTO-06)	fee-info.pdf	8383 b2c6fd66d14ca534c6b89bcd0d82e08ba8bc0904	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	321656		

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.